At any rate, no scientific liability is involved if he persists in the use of the necessarily unequal calendar month when a more convenient uniform period might be substituted. The French committee approves of M. Delaporte's economic calendar for its own special purposes, and recognises that it stands apart from the question of a civil calendar properly so called. H. C. P.

NOTES.

PROMINENCE has been given in the daily papers to an interview with Dr. J. O. Arnold, who has recently resigned from the chair of metallurgy at the University of Sheffield, relating to a new alloy tool-steel, the cutting powers of which are claimed to be far in advance of those of any rapid-cutting tools at present in the market. The element conferring this property is stated to be molybdenum. It was reported in the interview that Dr. Arnold had taken out British and American patents, but that, owing to the veto of the War Office, the Admiralty, and the Ministry of Munitions, he was not allowed to exploit his discovery, and that he was forbidden to communicate its details except under censorship to anyone in Great Britain. Meanwhile, representatives of the United States Government were said to be conducting inquiries in Sheffield. On December 19 it was announced, however, that Dr. Arnold had received notice from the Government that the restrictions had been removed. Until more information is forthcoming as to the precise chemical composition of the steel tools in question it will be well to suspend judgment on the matter. That rapid-cutting tools can be made with molybdenum as the alloy basis has been known for many years. Such tools, however, have hitherto been regarded as peculiarly sensitive to heat conditions, and therefore liable to injury by improper treatment. This has stood in the way of their exploitation in practice.

MORE than ninety years ago alcohol was synthesised from ethylene gas by Hennel. The gas was absorbed in sulphuric acid, with which it combined to form ethyl hydrogen sulphate. On distilling this with water alcohol was obtained in the distillate. Until recently the process has remained a purely laboratory operation. During the war, however, investigations were made into the practicability of utilising for the commercial production of alcohol the small proportion of ethylene present in the gas given off from coke-ovens. A good deal of progress was made and the possibility proved, but the process was not fully worked out. It appears that this has now been successfully accomplished. In a paper read at a meeting of the Cleveland Institution of Engineers, Middlesbrough, Mr. E. Bury, of the Skinningrove Iron and Steel Works, states that practical working has given a yield of 1·6 gallons of alcohol per ton of coal carbonised. The best results were obtained by absorbing the ethylene at a temperature of 60°–80° C. It is calculated that the coal used for coke-making in this country would yield more than 23,000,000 gallons of alcohol yearly, and the ethylene present in ordinary coal-gas, if similarly treated, would supply a further 27,000,000 gallons.

WE have received from the Royal Statistical Society a copy of a petition which has been forwarded to the Prime Minister urging the immediate appointment of a Royal Commission or Select Committee to inquire into the existing methods of the collection and presentation of public statistics and to report on the means of improvement. The lack of co-operation between the different Departments charged with the preparation of statistics, and the consequent lack of co-ordination between their publications, excellent though these are in many respects, and the absence of any sufficient information on points that are now of the first importance (*e.g.* wages, incomes, and home production), are so notorious that some action in the direction indicated is most urgently called for. Adequate information is the very basis of right reform, but in scarcely any case is it forthcoming. The petition received the most widespread support from members of both Houses, from learned societies, from county and municipal authorities, and from those interested in social questions and the use of statistics generally—support which will, we hope, secure its acceptance.

THE Electricity Supply Bill has had many vicissitudes in its passage through Parliament. In its final form it elicited little opposition, if no great enthusiasm. The appointment of Commissioners is universally welcomed. They can do much to co-ordinate the working of new schemes, and can effect great economies by standardisation. They will erect one or two super-stations which will effect an economy of fuel. They will probably also use a certain number of internal-combustion engines, which, theoretically at least, have a higher economy than steam turbines. The appointment of district boards with powers of compulsory purchase was strongly opposed by the electric supply companies, mainly on the ground that it was a breach of the Parliamentary bargain made in 1888. It was pointed out that electric supply was initiated by private enterprise, and that many of the pioneer companies had an anxious and unremunerative time in their early days. To take away the opportunity they had of bettering their financial position in the few remaining years of their concession was not just. The Government, influenced by the strong opposition to the suggested district boards, and possibly also by the approach of the end of the session, dropped all the contentious proposals. There is now a golden opportunity for the companies, both private and municipal, to enter into combination as "joint electricity authorities" for themselves, and it would be good policy for them to make a move in this direction, but at present we see no signs of such a movement. The proposals for district boards, which were all thoroughly discussed in Committee, will doubtless be revived either in this or in a future Parliament.

THE report of the Council of British Ophthalmologists on the desirability of a special qualification in ophthalmology presents a strong and well-considered case. The qualifications required by the principal hospitals of candidates for the post of ophthalmic surgeon usually the fellowship of the College of Surgeons of England, Edinburgh, or Ireland—furnish no evidence of special knowledge of ophthalmology. The council concludes that there should be a special examination for those who propose to devote themselves to this branch of medicine; and that, owing to the importance of a sound knowledge of the general principles of surgery, pathology, etc., this examination should form part of the examination for a higher degree or diploma, such as the M.S. or F.R.C.S., rather than that it should be a special examination in ophthalmology alone. The council rightly lays stress upon an exhaustive curriculum, including anatomy, pathology, optics, systematic and clinical ophthalmology, and operative surgery. The Council of British Ophthalmologists is doing excellent work in striving to improve the teaching and practice of ophthalmology. It has already reported upon the teaching of these subjects to undergraduates, the lighting of test types, and other matters. It deals with aspects of medicine which are not catered for by the ordinary medical societies, but are of great importance to medical men in their relationship to the general public. It is eminently desirable that the excellent example which the council has set should be followed by other branches of medicine.

THE last day of this year marks the bicentenary of the death of John Flamsteed, first Astronomer Royal of England, and the rector of the parish of Burstow, Surrey, where he is buried, uncommemorated, we understand, by any monument. Flamsteed was born four years after Newton, and was a native of Derbyshire, being the son of a well-to-do maltster. Though prevented by illness from attending a university, he was devoted to mathematical studies, and in 1671 sent a paper to the Royal Society. Three years later he published his "Ephemerides," a copy of which, being presented to Charles II. by Sir Jonas Moore, led to Flamsteed being appointed on March 4, 1675, "our Astronomical Observer" at a salary of 100*l*. per annum, his duty being "forthwith to apply himself with the most exact care and diligence to the rectifying the tables of the motions of the heavens and the places of the fixed stars, so as to find out the so much desired longitude of places for the perfecting the art of navigation." The observatory at Greenwich, constructed partly of brick from old Tilbury Fort and of timber and lead from the Tower of London, was designed by Wren and built at a cost of 520*l*., the money being derived from the sale of spoilt gunpowder. The struggles and disputes, the dogged perseverance, and the memorable achievements of Flamsteed have their place in the history of astronomy, but it may safely be said that never has king or Government made a better investment than when Greenwich was built and Flamsteed made passing rich on 100*l*. a year.

AT the general meeting of the Association of Economic Biologists on December 10 and 11 more than seventy new members were proposed, and Sir David Prain was elected president for the forthcoming year. Exhibits were made by Messrs. W. F. Bewley, E. E. Green, A. D. Cotton, and W. B. Brierley. Papers were read by Mr. W. F. Bewley on "Sleepy Disease, or Wilt of Tomato," Mr. W. E. Hiley on "A New Instrument for Measuring the Light Intensity in Woods," and Mr. F. R. Petherbridge on "The Life-history of the Strawberry Tortrix, *Acalla comariana*." December 11 was devoted to a symposium on "The Integration of Mycological Research with Practice in Agriculture, Horticulture, and Forestry." Sir Daniel Hall discussed the administrative problems involved and the organisation which the Board of Agriculture proposes in this connection. The training of investigators was treated by Prof. V. H. Blackman. The special needs and difficulties of agriculture were dealt with by Dr. E. J. Russell, of horticulture by Mr. F. J. Chittenden, and of forestry by Prof. W. Somerville. Sir David Prain discussed the part which the newly formed Imperial Bureau of Mycology will play in linking the investigator with the practical man. The meeting was presided over by Prof. F. W. Keeble, and in the discussion following the principal speakers a large number of members took part. The symposium was of great value in co-ordinating many divergent lines of thought, and there can be little doubt that the more frequent adoption of this method at scientific meetings would be conducive to that synthesis which is so great a desideratum in all natural science.

AN interesting and valuable gift which has more than a local interest has just been received by the Plymouth Institution. This is the fine vase presented to Sir William Snow Harris in 1845 by the Emperor Nicholas I. of Russia. Harris, who was born in Plymouth and educated at the Grammar School there, was trained as a doctor in Edinburgh, and for a time practised in his native town. After his marriage in 1824, however, he abandoned his profession to devote himself to the study of electricity. From 1819 onwards he was a frequent lecturer at the Plymouth Institution, where in 1822 his subject was "The Application of Fixed Conductors to Ships' Masts." In 1827 the Lord High Admiral—afterwards William IV. —while on a tour of inspection to the dockyards, visited the institution, and with some naval officers witnessed Harris's experiments. Two years later a Royal Society committee under Davy reported favourably on the proposals, but it was not until 1839, when the matter was referred to another committee, that Harris's new conductors were introduced into the British Navy, although the Russian Navy was already using them. The Copley medal had been given to Harris in 1835, and other honours followed. He was awarded a Civil List pension in 1841; the Emperor of Russia gave him a valuable ring and the vase in 1845; two years later he was knighted, and the Government afterwards made him a grant of 5000*l*. He died in the house overlooking the Hoe in 1867, and his name is inscribed on one of the panels in the Plymouth Guildhall. Harris's fixed conductors replaced the temporary conductors introduced by Watson in 1762, and led to a great diminution in the loss of ships through lightning. His scientific work and his improvements are a notable instance of the benefits conferred upon the community by local scientific societies, and no fitter place for the preservation of the beautiful vase presented to Harris could be found than the institution which saw the birth of his discoveries.

IT is announced in *Science* that Dr. Frank Schlesinger, director of the Allegheny Observatory of the University of Pittsburgh, has been elected director of the Yale Observatory.

THE Physical and Optical Societies' annual exhibition, to be held on Wednesday and Thursday, January 7 and 8, 1920, at the Imperial College of Science, South Kensington, will be open both in the afternoon (from 3 to 6 p.m.) and in the evening (from 7 to 10 p.m.). Prof. F. J. Cheshire will give a discourse on "Some Polarisation Experiments" at 8 p.m. on January 7 and at 4 p.m. on January 8, and Prof. A. O. Rankine will give a discourse on "The Use of Light in the Transmission and Reproduction of Speech" at 4 p.m. on January 7 and at 8 p.m. on January 8. Admission in all cases will be by ticket only, obtainable by members of various societies through the secretaries. Others interested should apply direct to the Secretary of the Physical Society, National Physical Laboratory, Teddington, S.W.

THE weather of the past autumn was so abnormal that a few facts concerning it are worth recording. At Greenwich for the whole autumn the mean temperature was 47·7°, which is 3·0° below the normal. There are only three autumns in the last hundred years with lower means—46·8° in 1829, 47·4° in 1840, and 47·0° in 1887. The autumn rainfall was 3·23 in., which is 49 per cent. of the average. There have been only two autumns in the last hundred years with a smaller rainfall—1834 with 2·84 in., and 1858 with 2·80 in. October was the driest month of the year with the exception of May, whereas it is normally the wettest of the twelve months. From October 26 to November 16 inclusive, twenty-two days, the maximum temperature at Greenwich was below 50°, and from November 10–16, seven days, it was below 40°. There has been no similarly long period without a temperature of 50° at the corresponding time of year during the last seventy-eight years. This cold period was due to an abnormal distribution of atmospheric pressure, the barometer being high over Iceland and the neighbourhood, whilst it was low to the south-east and south of England, causing a steady drift of cold north-east and east winds over the British Isles.

IN the Journal of the Bihar and Orissa Research Society for September last Mr. M. H. Shastri discusses the contributions of Bengal to Hindu civilisation. In the religious sphere western Bengal was the scene of origin of Buddhism and Jainism. It was the aborigines of Bengal who taught the Vedic Aryans how to tame the elephant and to manufacture silk and cotton cloth. It was from the local performances of mystery plays that the Indian theatre was founded in Bengal. The writer's views in some instances may be open to comment, but the article is an interesting contribution to Indian history.

WE have received the annual report of Livingstone College for the year 1918–19. The college gives training in elementary medicine, surgery, and hygiene to missionaries going to spheres of work abroad far from medical aid. During the war the college was transformed into an auxiliary hospital, but has now resumed its proper work. The fees of students do not suffice to cover expenses, the deficit being met by donations, and further donations to the college funds are urgently needed.

IN the *Quarterly Journal of Experimental Physiology* (vol. xii., No. 3) Sir E. Sharpey Schafer shows that the fatal result of section of both vagus nerves is due not to pneumonia, resulting from absence of sensation in the parts supplied by these nerves and lack of protection from foreign matter entering the lungs, but to paralysis of certain muscles of the larynx, leading to obstruction of the glottis and slow asphyxia. If this obstruction is prevented, animals live indefinitely with scarcely any abnormal symptoms. In the same journal Prof. Halliburton points out that the waves in the blood-pressure seen during asphyxia are correctly designated as "Traube" waves. Those described by S. Mayer are of a different nature, and being artificial have no physiological significance.

THE *Veterinary Review* for November (vol. iii., No. 4) provides a valuable summary of literature on current veterinary science and practice. Among the reviews is one giving a full *résumé* of the methods employed in the examination of milk at the Intercommunal Laboratory at Brussels, with details of the method of scoring. A maximum of 150 points is given for all kinds of milk, and samples of sterilised and pasteurised milk must obtain not fewer than 120 points; aseptic raw milk, 115 points; and ordinary milk, 100 points. The scoring is based upon number of bacteria present, catalase test, reduction test, fermentation test, microscopic characters of films, and kind of bacteria present.

THE Thomas Vicary lecture on "The Surgical Tradition" was delivered in the Royal College of Surgeons of England on December 3 by Sir John Tweedy. In 1646 Mr. Edward Arris, and in 1655 Mr. John Gale, gave sums of money to the Company of Barbers and Surgeons for the purpose of lectureships. In 1745, on the dissolution of the union between the Barbers and the Surgeons, these funds became vested in the Surgeons, and afterwards in the Royal College of Surgeons, and "Arris and Gale" lectures have been delivered ever since 1810. Early in the present year the Barbers' Company founded a lectureship at the Royal College of Surgeons to perpetuate the memory of Thomas Vicary, Master of the Barbers' Company in 1540, and the former association between the Barbers and the Surgeons. Sir John Tweedy, who is a past-president of the Royal College of Surgeons and a past-master of the Barbers' Company, first reviewed the life of Vicary, who was Serjeant-Surgeon to Henry VIII., Edward VI., Mary, and Elizabeth, and also resident surgical governor to St. Bartholomew's Hospital. Sir John Tweedy then surveyed the progress of surgery from the period of Egypt and Greece, dealing in succession with the times of Celsus and Galen, the Arabian writers, Lanfranc and Ambroise Paré, concluding with a notice of Dr. J. F. D. Jones, who discovered the true principles of the ligature of arteries in 1805.

SOME very interesting notes on the migration of birds over the Mediterranean Sea, by Mr. C. Suffern, appear in *British Birds* for December. The author holds that there are at least three main routes of migration, apart from the Gibraltar line. One of these runs from Cape Bon to Sardinia, Corsica, and the Riviera. Another from Egypt to Crete and Greece. The third seems to run from Africa to Malta, Sicily, and Italy.

MR. M. A. C. HINTON, in the *Scottish Naturalist* for November-December, describes a new species of field-mouse from Foula, thus adding another to the list of insular forms which have been brought to light by an intensive study of these northern islets. The Foula field-mouse (*Apodemus fridariensis thuleo*)—one of the *Apodemus sylvaticus* group—most nearly resembles the field-mouse of Fair Isle, from which it differs in its smaller size and conspicuously larger feet. Very carefully prepared tables of external and internal measurements enable an exact comparison to be made with other British species of the *sylvaticus* group.

THE 1918 Report of the Agricultural and Horticultural Research Station, Long Ashton, Bristol, states that, as is the case with all such stations, the normal work has been considerably interrupted owing to war conditions, and its place has been taken by technical and advisory work, as well as by some few instruction courses for officers. This outside work included investigations into the utilisation of cider-fruit by the jam trade and for other purposes, miscellaneous experiments in connection with fruit and vegetable preservation, and an extensive series of experiments on potato-spraying for the prevention of potato disease. The last-named experiments include investigations into the use of Burgundy mixture and of other copper sprays, and discuss what proportions of soda and copper sulphate are most advantageous in the former mixture. The normal experimental work with cider for the season 1917–18 had to be reduced considerably, and the varieties tested were those which had been examined in former years. The trial orchards for cider-production have received rather scant attention, though some new orchards have been added. Other work includes the study of "reversion" and resistance to "big bud" in black currants; the preserving value of various spices and essential oils; the influence of concentration of sugar solutions upon the growth of micro-organisms; as well as a large amount of advisory work and several special investigations which arose out of it.

SOME improvements on his well-known classification of climates are proposed by M. W. Koppen. A summary of his suggestions, without a map, is given in

Revue générale des Sciences for October 15. The three main divisions are tropical or *zone mégathermique*, temperate or *zone mésothermique*, and cold or *zone microthermique*. These are based on considerations of temperature. Two other divisions are placed on the same level, one embracing hot deserts and the other cold deserts, but in their case amount of precipitation is an important determining factor. Subdividing these zones, M. Koppen finds eleven principal climates, which he names as follows: (1) Tropical forests, (2) savannas, (3) steppes, (4) deserts, (5) temperate with dry winter, (6) temperate with dry summer, (7) temperate humid, (8) cold with wet winter, (9) cold with dry winter, (10) tundra, and (11) perpetual ice. In addition to these main climates M. Koppen recognises a large number of secondary and transition climates. With the help of these lists he gives two or three reference letters to every climate on the globe. We gather from the summary that he distinguishes some fifty different climates. Thus the climate of Brisbane is indexed as C*fa*, which designates a warm temperate climate with rainfall at all seasons, and the mean of the warmest month not above 22° C. Cairo is indexed BW*h*, which means an arid climate of the desert type, with a mean annual temperature above 18° C.

In a paper read before the London Mathematical Society in 1903 Sir Joseph Larmor showed that when the disturbance propagated into a medium is determined by considering each element of an advancing wave-front to constitute a source of disturbance, as Huygens did two centuries ago, the problem of finding the strengths of these sources was indefinite from an analytical point of view. Many distributions could be found over the wave-front which would give the same total effect. In a further paper read before the society on November 13 Sir Joseph shows that, although analytically the problem is indefinite, physically one specification only is permissible.

In the *Biochemical Journal* for November Prof. W. D. Halliburton and Messrs. J. C. Drummond and R. K. Cannan describe some experiments made to ascertain the food value, if any, of the synthetic product prepared from olive oil and mannitol by Lapworth and Pearson. The synthetic oil possessed a taste and odour recalling those of olive-oil, but somewhat less pleasant; insufficient oil was at hand to make experiments on the higher animals, so rats were employed in the work described. From the results so obtained Halliburton, Drummond, and Cannan conclude that "mannitol olive-oil" is utilised by the animal organism practically to the same extent as olive-oil itself, and no toxic action was observed to follow its prolonged administration to rats.

A short account of the methods used in France at the present time for the production of radium bromide and other radio-active substances is given by M. Demenitroux in *La Nature* for November 1. Pitchblende from Joachimsthal being no longer obtainable, the industry is dependent on carnotite from Colorado, autunite from Portugal, and certain rare-earth minerals from Madagascar. These contain fewer than 15, and in some cases not more than 4, milligrams of active material per ton. The first operation consists in the separation of the barium, and this process is a long and costly one. The radio-active materials are separated with the barium, and the second operation is the separation of the two from each other. This is done by fractional crystallisation, a tedious but certain process which involves, as a rule, 500 successive crystallisations of the material. Finally, one of the tubes used in medicine containing 100 milligrams of radium bromide is obtained from 12 tons of the ore, 3 tons of hydrochloric and 1 ton of sulphuric acid, 5 tons of carbonate of soda, and 10 tons of coal. The present cost in France of the hydrated bromide of radium, $RaBr_2,2H_2O$, is 500 francs per milligram.

Hitherto it has been stated in the literature that chloropicrin can be distilled unchanged at ordinary pressure. Messrs. J. A. Gardner and F. W. Fox have observed, however (Journal of the Chemical Society for October), that when the pure anhydrous substance is distilled at atmospheric pressure a small amount of a yellowish-red gas, resembling diluted nitrous fumes, is invariably produced, and can be seen in the atmosphere of the condenser and receiver. These authors show that this is due to a slow decomposition of the boiling chloropicrin into carbonyl and nitrosyl chlorides, according to the equation

$$CCl_3.NO_2 = COCl_2 + NOCl.$$

If 200 c.c. of the substance are boiled gently, the rate of decomposition is approximately 2 c.c. per day. This observation will account for the divergence between statements made on the physiological activity of chloropicrin. Further, the experiments of Frankland, Challenger, and Nicholls, showing that under some conditions chloropicrin is quantitatively reduced to methylamine, and under others to ammonia, would be explained by the reduction in the first case of chloropicrin *per se*, and in the second of its decomposition products. In some reactions chloropicrin seems to act as a nitro-compound, *e.g.* it can be substituted for nitrobenzene in Skraup's method of preparing quinoline; whilst in others the results can be explained as due to the carbonyl and nitrosyl chlorides.

The latest catalogue of second-hand books of Messrs. W. Heffer and Sons, Ltd., Cambridge (No. 184), comprises a number of works on history and economics from the library of the late Rev. Dr. W. Cunningham; also books on architecture and archæology, and old travels to the East.

Mr. Francis Edwards, 83 High Street, Marylebone, W.1, has just circulated a Catalogue (No. 396) of autograph letters, historical documents, and manuscripts. Many of the letters are the work of explorers and men of science. The section devoted to manuscripts contains several items of great historical value.

Among forthcoming books of science we notice the following:—A "Peat Industry Reference Book," the late F. T. Gissing (*Charles Griffin and Co., Ltd.*); "The Life and Inventions of Sir Hiram S. Maxim," P. F. Mottelay (*John Lane*); "Military Psychiatry in Peace and War," Dr. C. S. Read (*H. K. Lewis and Co., Ltd.*); "The Life and Letters of Silvanus Phillips Thompson, F.R.S.," Jane S. and Helen G. Thompson (*T. Fisher Unwin, Ltd.*); and "The Life of Sir William White, K.C.B., F.R.S.," F. Manning (*John Murray*).

In reference to our notice of the *Daily Telegraph* Victory Atlas (November 13, p. 276), Messrs. Geographia, Ltd., take exception to the remark that "a mistake is made in the area of the Slesvig plebiscite." This criticism, which had reference to the course of the frontier of that area, was based on the abstract of the Treaty of Versailles published in Treaty Series, No. 4, and our reviewer wishes to examine the German large-scale maps of Slesvig before accepting the boundary shown by Messrs. Geographia, Ltd. Meanwhile, we regret if his reading of the text and maps of the abstract gave a wrong impression of the accuracy of the *Daily Telegraph* Atlas.